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CARDIAC FUNCTION AND HEART FAILURE

HEMODYNAMIC RESPONSES TO ARTERIAL VASODILATION FUNDAMENTALLY DIFFER IN HEART FAILURE WITH PRESERVED VERSUS REDUCED EJECTION FRACTION

ACC Oral Contributions

Ernest N. Morial Convention Center, Room 243

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Session Title: Novel Strategies in the Management of Heart Failure

Abstract Category: 21. Myocardial Function/Heart Failure—Clinical Pharmacological Treatment

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Background: Clinical trials of vasodilators have produced disparate results in patients with heart failure and reduced or preserved ejection fraction (HFrEF; HFpEF). We compared the acute hemodynamic effects of arterial vasodilation with sodium nitroprusside (SNP) in HFpEF and HFrEF.

Methods: Patients with HFrEF (n=175) and HFpEF (n=83) who underwent clinically-indicated invasive hemodynamic assessment at rest and during SNP were compared.

Results: At baseline, patients with HFpEF displayed higher blood pressure (BP) and cardiac index (CI) compared with HFrEF, while pulmonary capillary wedge pressure (PCWP) and mean pulmonary artery pressure (PA) were similar (Table). Despite comparable reductions in systemic afterload (arterial elastance, Ea) and pulmonary vascular resistance index (PVRI), systemic BP dropped to greater extent in HFpEF. In contrast, patients with HFrEF displayed greater increases in stroke volume index (SVI) and cardiac index (CI) compared with HFpEF, with less drop in BP.

Conclusion: The hemodynamic response to arterial vasodilation is fundamentally different in HF patients with preserved versus reduced ejection fraction. Reduction in systemic blood pressure is exaggerated in HFpEF, while enhancement in stroke volume is greater in HFrEF. These findings may partially explain the treatment effect disparities noted in randomized trials for HFpEF and HFrEF.

	Baseline Median (IQR) or \pm SD		Change with SNP Median (IQR) or \pm SD	
	HFpEF	HFrEF	HFpEF	HFrEF
SNP dose (mcg/kg/min)	-	-	1.5 (1,3)	2 (1,2)
Heart Rate (bpm)	70 (60, 76)	70 (62, 81)	+4 \pm 9	+2 \pm 9
SBP (mmHg)	166 (144, 180)	113 (74, 92)*	-51 (-28, -71)	-22 (-11, -36)*
Ea (mmHg/ml)	2.0 (1.6, 2.8)	1.7 (1.5, 2.4)†	-0.6 (-0.5, -1.2)	-0.8 (-0.4, -1.3)
PCWP (mmHg)	25 (21,30)	25 (20,29)	-9 (-12, -6)	-7 (-13, -4)
Mean PA (mmHg)	41 (35, 48)	40 (33, 47)	-11 (-7, -17)	-10 (-6, -16)
CI (L/min/m ²)	2.4 (2, 2.8)	2.0 (1.6, 2.3)*	+0.3 \pm 0.7	+0.9 \pm 0.7*
SVI (ml/m ²)	34 (28, 42)	27 (22, 34)*	+4 \pm 12	+11 \pm 10*
PVRI (WU*m ²)	6.5(4.3, 10.4)	7.0 (4.8, 9.5)	-2.1 (-4.3, 0.4)	-2.9 (-5, -1.4)

*p<0.001 compared with HFpEF; †p<0.05 compared with HFpEF